UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

SINGULAR COMPUTING LLC, Plaintiff, v. GOOGLE LLC, Defendant.	Civil Action No. 1:19-cv-12551-FDS

PLAINTIFF'S OPPOSITION TO GOOGLE LLC'S
MOTION TO COMPEL

Plaintiff, Singular Computing LLC ("Singular"), respectfully submits this brief in opposition to the motion of defendant, Google LLC ("Google"), to compel regarding certain purportedly insufficient discovery responses (Dkt. No. 245).[1] For the reasons set forth below, Google's motion ("Motion") should be denied.

I.   BACKGROUND

The deadline for fact discovery in this case is July 23, 2021. Google bases its last-minute motion on the erroneous accusation that "Singular has offered no justification for refusing to respond" to Google's discovery requests. Motion at 1. In fact, as explained below, Singular has responded. Singular has produced thousands of pages of documents; has answered and/or objected to Google's interrogatories, and has answered and/or objected to Google's requests for admissions. Singular has not refused to respond to Google's discovery requests.

In addition, Google has now taken the deposition of the inventor named on the Patents-in-Suit (Dr. Bates) for 8 hours. Dr. Bates is also the CEO of Singular. Thus, Google has had more than a fair opportunity to question Dr. Bates regarding these discovery requests.

II.   ARGUMENT

A.   INTERROGATORIES 22-24

Google states that these interrogatories request the following:

Interrogatory No. 22 asks Singular to "[d]escribe Singular's alleged conception, design, and use of a 14-bit 'approximate float' data type and identify all related documents."

Interrogatory No. 23 asks that Singular "[i]dentify all documents regarding Singular's alleged conception, design, and use of a 16-bit floating-point number format having an 8-bit exponent and 7-bit fraction."

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[1] Unless otherwise noted, all exhibits referred to herein are attached to the accompanying Declaration of Kevin Gannon.

See Motion at 2.

> Google argues that:

> Singular maintains that it need not describe how Singular's founder Dr. Bates allegedly conceived of these number formats, disclose where such conception is contained in the patents, or identify where or when any disclosures were allegedly made to Google.

Id. at 3-4. Google's argument should be rejected.

As Google notes, Singular objected to these interrogatories, both in its General Objections and specifically as vague and ambiguous. These interrogatories are badly drafted and, therefore, objectionable. Singular maintains those objections. The interrogatories should be rephrased to put them in an acceptable form.

For example, as shown above, interrogatories 22 and 23 are directed to the "conception, design, and use" of 14-bit and 16-bit floating point formats. As explained in Singular's opposition to Google's Motion to Dismiss for Lack of Patentable Subject Matter, Dr. Bates does not claim to have conceived of or designed 14-bit/16-bit floating-point data types. *See* Dkt. No. 44 at p. 17. Thus, the term "conception" makes no sense in this context. Neither do the asserted claims recite such data types. Thus, the interrogatories are make no sense. Singular stands by its responses and objections.

In addition, the term "conception" has a particularized meaning in patent law. It has always been Federal Circuit law that "conception" of an invention occurs when there is a "formation in the mind of the inventor, of a definite and permanent idea of the <u>complete</u> and operative invention, as it is [t]hereafter to be applied in practice." *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1376 (Fed. Cir. 1986) (emphasis added). The asserted claims include the many different elements that form the "complete" invention. **None** of the claims recite as an element a 14-bit or 16-bit floating point data type.

For example, asserted claim 53 of the '273 patent, including the claims from which it depends, recites as follows:

> *A device:*
>
> *comprising at least one first low precision high dynamic range (LPHDR) execution unit adapted to execute a first operation on a first input signal representing a first numerical value to produce a first output signal representing a second numerical value,*
>
> *wherein the dynamic range of the possible valid inputs to the first operation is at least as wide as from 1/1,000,000 through 1,000,000 and for at least X = 5% of the possible valid inputs to the first operation, the statistical mean, over repeated execution of the first operation on each specific input from the at least X % of the possible valid inputs to the first operation, of the numerical values represented by the first output signal of the LPHDR unit executing the first operation on that input differs by at least Y = 0.05% from the result of an exact mathematical calculation of the first operation on the numerical values of that same input;*
>
> *wherein the number of LPHDR execution units in the device exceeds by at least one hundred the non-negative integer number of execution units in the device adapted to execute at least the operation of multiplication on floating-point numbers that are at least 32 bits wide.*

See Ex. A at 31:62-32:63.

Asserted claim 7 of the '156 patent, including the claims from which it depends, recites the following:

> *A device comprising:*
>
> *at least one first low precision high-dynamic range (LPHDR) execution unit adapted to execute a first operation on a first input signal representing a first numerical value to produce a first output signal representing a second numerical value,*
>
> *wherein the dynamic range of the possible valid inputs to the first operation is at least as wide as from 1/1,000,000 through 1,000,000 and for at least X=5% of the possible valid inputs to the first operation, the statistical mean, over repeated execution of the first operation on each specific input from the at least X % of the possible valid inputs to the first operation, of the numerical values represented by the first output signal of the LPHDR unit executing the first operation on that input differs by at least Y=0.05% from the result of an exact mathematical calculation of the first operation on the numerical values of that same input; and*

at least one first computing device adapted to control the operation of the at least one first LPHDR execution unit

wherein the at least one first computing device comprises at least one of a central processing unit (CPU), a graphics processing unit (GPU), a field programmable gate array (FPGA), a microcode-based processor, a hardware sequencer, and a state machine; and,

wherein the number of LPHDR execution units in the device exceeds by at least one hundred the non-negative integer number of execution units in the device adapted to execute at least the operation of multiplication on floating point numbers that are at least 32 bits wide.

See Ex. B at 29:54-30:23.[2] Thus, the foundation of the interrogatories is flawed and

Singular stands by its prior responses and objections.

Interrogatory 24 relates generally to the disclosure to Google of 14-bit and 16-bit

floating point formats:

> **Interrogatory No. 24** asks Singular to "[i]dentify any disclosure to Google by Singular, including without limitation by Dr. Bates, of either (a) a 14-bit 'approximate float' datatype or (b) a 16-bit floating-point number format having an 8-bit exponent and 7-bit fraction."

See Motion at 2.

In response, Singular identified the patents-in-suit, related patent applications and their

prosecution histories that disclose a set of data types that may be used in embodiments of the

invention. *See* Google Ex. E at pp. 7-8. Singular also responded that Google was aware of these

patents and that subsequent presentations given by Dr. Bates to Google contained such

information. *Id.* Google retained those presentations. For example, Google produced to Singular

a copy of Dr. Bates' June 2011 presentation to Google. *See* Ex. D (GOOG-SING-00083543-64).

In that presentation, for instance, Dr. Bates discussed "approximate floating point." *Id.* at 3.

Further, Singular's response specifically referenced personal conversations that Dr. Bates had

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[2] The same is true with respect to asserted claims 4 and 13 of the '961 patent – there is no recitation of 14-bit or 16-bit data types. *See* Ex. C at 30:17-51 & 31:25-54.

with Google employees, specifically including Jeffrey Dean, during which such data types may have been discussed. *See* Google Ex. E at pp. 7-8.

The patents-in-suit are also referred to in Singular's response, and they also discuss floating point data types. For example, the specifications of the patents-in-suit include Figure 5 and recite as follows regarding that exemplary 14-bit floating point format:

> Fig. 5 shows the word format 500 for these numbers, in the present embodiment. It has one NAN bit 502a, one bit 502b for the sign of the value, and 12 bits 502c-e representing the logarithm. The logarithm bits include a 5 bit integer part 502d and a 6 bit fraction part 502e. To permit the logarithms to be negative, there is a sign bit 502c for the logarithm which is represented in two's complement form.
>
> * * *
>
> Other variations may be used, so long as they have low precision and high dynamic range.

See '273 patent (Ex. A) at 12:38-49; *see also id.* at 6:3-22.

As indicated in Singular's response to this interrogatory, Google was aware of this information because it was aware of Singular's patents. More particularly, in a later (January 2014) presentation to Google, Dr. Bates again discussed ████████████████████ ██████████████████████████████████████ *See* Ex. E (GOOG-SING-00032372-93) at p. 17 (███████████████████████████████).

In addition, Google had its IP attorneys review Singular's patents containing this floating-point data type. One of those attorneys (Catherine Tornabene) testified that ███████ ████████████████████████████████ *See* Ex. F at p. 11. Google repeatedly (and improperly) refused to allow the witness answer ████████████████████████ ████████████████████████ *Id*. at 11-17. Nonetheless, as IP counsel, unless she was willfully blind thereto, she/Google would have been aware that the patents disclosed the

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foregoing floating point data types. Thus, Singular stands by its response and objections regarding this interrogatory.

B.   RFP 82 & INTERROGATORY 16

These requests are plainly an improper fishing expedition. They are directed to Singular's nascent potential future product designated S2. The S2 is a future prototype of a Singular chip. The chip itself has not been manufactured and no physical embodiment of the chip exists. Moreover, the chip is not relevant to any issue in this case. Obviously, it is not an accused product. It is not potential prior art. It has not been offered for sale or sold. Thus, it is not relevant to damages. Hence, Singular objects to producing the requested documents.

As the Court is aware from the Amended Complaint and prior motion practice, Singular alleges that Google stole Dr. Bates' LPHDR (Low Precision High Dynamic Range) invention after Dr. Bates disclosed his earlier S1 prototype to Google. *See*, *e.g.*, Amended Complaint (Dkt. No. 37) at ¶¶ 16-26. After such disclosure, Google's founders and chief engineers recognized the invention as the solution to the problems Google was having in ramping up its prior computer systems to handle Google's emerging AI (Artificial Intelligence) applications (such as Photo and Translate). *Id.* at ¶ 23. More particularly, after Dr. Bates' disclosure, Google replaced the computers in its data centers with the accused TPU v2 and v3 products that incorporate Dr. Bates' LPHDR designs. *Id.*at ¶ 22. Nonetheless, Google adamantly refuses to pay Singular a license for using the invention. Not surprisingly, having been fleeced once, by disclosing the details of the S1 to Google, Singular is reluctant to give Google the opportunity to fleece Dr. Bates again via disclosure of the design for the S2; particularly when the S2 is not relevant as it is not prior art, is not an accused product, and has not been offered for sale or sold.

The only purported relevance Google suggests is its argument that the S2 may "undermine Singular's claims as to the S1's commercial success." *See* Motion at 6. This argument should be rejected. The S2 has not been offered for sale or sold. Thus, the S2 is not indicative of the commercial success *vel non* of the S1. Accordingly, Google's motion should be denied regarding RFP 82 and Interrogatory 16. *See*, *e.g.*, *Penalbert-Rosa v. Fortuno-Burset*, 631 F.3d 592, 596 (1st Cir. 2011) ("'fishing expeditions' are not permitted"); *see also Hofer v. Mack Trucks, Inc.*, 981 F.2d 377, 380 (8th Cir. 1992) ("While the standard of relevance in the context of discovery is broader than in the context of admissibility * * *, this often intoned legal tenet should not be misapplied so as to allow fishing expeditions in discovery").

C.   INTERROGATORY 26

Interrogatory 26 requests the basis for Singular's alleged allegation in paragraph 94 of the FAC that "the program compiled from the FAC Testing Source Code is an accurate model of the 'TPU's float32 multiplication operation.'" *See* Motion at 7. Singular responded and objected on several grounds. Singular stands by those objections:

i)   False Premise

Singular objected because the interrogatory is based upon a false premise. *See id.*[3] The basis of this objection is that, contrary to the wording of interrogatory 26, paragraph 94 of the FAC does not allege that the FAC Testing Source Code is an "accurate model" of the TPU's float 32 multiplication operation. A copy of paragraph 94 of the FAC is submitted as Exhibit G. Paragraph 94 is based upon Google's own documents, and describes how those documents show that the TPUs use floating point. To that end, the FAC Testing Source Code was intended to

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[3] Google incorrectly argues that "Singular refused" to explain the flawed premise. Motion at 7. Singular explained the flawed basis during the meet-and-confer and to the Court at the hearing before Magistrate Judge Cabell on July 12, 2021.

show that multiplication performed by the accused TPUs, as described in Google's own documents, satisfies the "X=" and "Y=" limitations of the asserted claims. *See id.* As can be seen, however, paragraph 94 makes no mention of the FAC Source Code. *Id.* Likewise, there is no characterization in paragraph 94 of the accuracy of the model (although Singular obviously believes the code and test results are accurate). *Id.* And, as set forth below, Singular provided the code to Google and explained how it works to allow Google to run tests itself. As the interrogatory is based upon a false premise that paragraph 94 states something that it clearly does not, Singular stands by this objection.

        ii)   <u>Overly Broad and Unduly Burdensome</u>

The interrogatory is also overly broad and unduly burdensome. For example, Singular produced the FAC Testing Source Code to Google in February, 2021. In a response to Google's interrogatory no. 18 served on Google in June 2021, Singular explained in detail how Singular ran the code. *See* Ex. H. If Google disagrees with Singular, and believes that the code does not represent the way in which Google's own documents describe how the accused TPUs work, Google is free to run the Singular code that was provided to Google's counsel 5 months ago. Either Google has not bothered to run the code itself or, having done so, Google has no problem with the code or Singular's explanation of how it works. Either way, given Singular's prior production of the source code and detailed explanation of how the code operates, Singular stands by its objection.

D.   <u>RFP 17</u>

As indicated in Google's brief, Singular has agreed to supplement its response to this Request for Production. *See* Motion at 9.

E.   RFA 2

RFA 2 reads as follows:

Admit that the Patents-in-Suit do not encompass execution units using an 8-bit integer format.

See Google Ex. O, p. 2.

Singular objected to responding to RFP 2 at this time because the Request involves claim construction. The best and only case that Google cites in support of its argument is *A & V Fishing, Inc. v. Home Ins. Co.*, 145 F.R.D. 285, 288 (D. Mass. 1993). *See* Motion at 11. That 28-year old marine insurance case had nothing to do with patents, construing patents, or otherwise determining what patents may "encompass." The three Requests at issue there related to an insurance policy and were straightforward: (1) admit the defendant sells insurance; (2) admit defendant sold the policy in dispute, and (3) admit the policy was in force and effect. *Id.* at 286. In view of relevant patent cases cited below, Singular does not understand why Google would cite such a marine insurance case here.

In patent cases, requests for admission regarding claim construction issues need not be answered. *See, e.g.*, *LG Philips Co., Ltd. v. Tatung Co.*, No. 04-343, 2007 WL 9771321, at *1 (D. Del. Jul. 3, 2007) ("The Court also agrees with the Special Master that [plaintiff] was not required to respond to Request for Admission No. 15 because it involved claim construction"); *see also Tulip Computers Intern., B.V. v. Dell Comp. Corp.*, 210 F.R.D. 100, 108 (D. Del. 2002) ("requests directed towards applying the claims of the patent . . . in reality are requests for legal conclusions and, therefore, improper"); *B/E Aerospace, Inc. v. Zodiac Aerospace*, No. 2:16-cv-01417, 2017 WL 3671368, at *1 (E.D. Tex. Mar. 14, 2017) (requests involving claim construction improper prior to claim construction ruling).

Google argues that Singular "can respond based on the information available and 'if appropriate seek to amend its response at a later date.'" *See* Motion at 11. Not only has the Court yet to issue its claim construction, an "8-bit integer format" is not recited in any of the asserted (or non-asserted) claims of any of the Patents-in-Suit. Accordingly, Singular has not determined whether or not the Patents-in-Suit may "encompass" (whatever that means in this context) using an 8-bit integer format.

III.   CONCLUSION

For the reasons set forth above, Google's motion to compel should be denied.

Dated: July 22, 2021   Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that all counsel of record who have consented to electronic service are being served with a copy of this document via the Court's CM/ECF system.

/s/ Paul Hayes